

At base, private sector interest in shared resource projects is market driven. Regardless of administrative ease or public sector conditions on rights-of-way access, telecommunications service providers have no reason to negotiate for additional rights-of-way-whether highway or other-if their current capacity is sufficient to satisfy existing and anticipated demand or if they feel that there is insufficient market for their services in the areas accessed by those rights-of-way. For example, the City of La Mesa, California, would like to use shared resources to expand a system of fiber optics to operate traffic signals and to develop other ITS uses but faces a "geographic barrier": the suburban jurisdiction lacks the density to attract private partners interested in serving its population.

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 U.S. Department of Transportation

4.0 FINANCIAL ISSUES

Financial issues include public and private resource valuation, support costs, and tax implications of private sector participation in typically tax-exempt projects. To date, compensation to the public agency in shared resource projects appears to have been based on estimates of public sector needs or private partner willingness to contribute rather than on a systematic evaluation of the worth of the shared public resources. As these projects become more common, systematic valuation of the public resources involved will become more important. In determining costs and benefits of different forms of compensation, public agencies must also address out-of-pocket costs that are incurred when a public agency forms a partnership; that is, the costs of soliciting bids, screening, and monitoring joint ventures. Federal tax policy creates an additional disincentive: potential income tax liability and potential loss of tax-exempt status for bonds issued to finance a project.

4.1 VALUATION OF PUBLIC RESOURCES

Before embarking on an ambitious procurement for a shared resource project, the public agency must determine what it considers a fair trade for the resources it brings to the partnership. Realistic estimates of the value of public right-of-way are important because they help the public sector identify an appropriate range of compensation in negotiations with potential private sector lessees.

Although access to rights-of-way is leased and prices are recorded in various contracts, these values may not be generally available because they are considered proprietary. In the absence of an organized market that monetizes public rights-of-way, one of the issues likely to become important is more systematic and objective valuation of the non-traded public resources. In the cases reviewed to date, there was limited systematic and explicit evaluation of the primary resource (access to the public right-of-way). Rather, it appears that barter and even cash arrangements are based on what public officials estimate to be public sector communications needs and what they perceive private partners are willing to provide.

Defining the value of access means taking into account the costs of installing the infrastructure, particularly differences among alternative rights-of-way, and variations in context and the monetized value of any perceived advantages or disadvantages of highway right-of-way over the next best alternative.

4.1.1 Factors Affecting Value

Telecommunications growth and competition among telecommunications providers generate demand for new infrastructure in a given location. Ultimately, it is this force that determines the general value of right-of-way for telecommunications in a given locale. At any level of demand for right-of-way access in general, the competitive value of highway access depends on (1) the costs of supplying telecommunications using alternative (competitive) approaches and (2) factors that cause variations in the costs and benefits of installing infrastructure along highway right-of-way.

Factors responsible for value and variations in value along any particular highway or roadway include the following:

- *Location* (urban, suburban, rural) and *section of the country* influence real estate values and thus the costs of alternatives, such as assembling individual parcels or leasing access rights from railroads. *Type of terrain* affects installation costs; if highway right-of-way offers easier terrain than the next best alternative, it is cost-saving and thus the right-of-way is "worth" more.
- Similarly, *location within the highway right-of-way* affects installation costs and thus value of right-of-way access from the lessee's point of view. That is, installation in the median is generally the least-cost highway option for the telecommunications company because fewer or no problems are posed by highway entry points and intersections. Because of greater traffic safety concerns, however, the median is the least desirable location for telecommunications or other utility infrastructure from the viewpoint of a public sector transportation agency.
- *Infrastructure security* is related to the type of right-of-way and to location within that right-of-way. For example, security may be better just inside the fence line than along the median, and this can mitigate the installation cost advantages of location in the median. Moreover, in general, telecommunications security from damage is perceived as greater on interstate/freeway right-of-way-median or fence line than along railroad right-of-way, private land, or other roadways. Najafi et al. (1990) evaluated the relative value of different right-of-way locations based on a survey of 78 public and private officials. Respondents rated public safety, aesthetics, preservation of environment, and

security of system on a scale of 1 to 4 for five right-of-way corridor options: non-interstate highway, private land, railroad, interstate/freeway median, and interstate/freeway fence line. Interstate/freeway median was rated lowest for traffic safety (average 1.5 rating)-clearly a legitimate concern for transportation agencies. Regarding system security, however, interstate/freeway fence line and median locations rated 3.5 and 3.1, compared with 2.2 for non-interstates and 2.7-2.8 for private land and railroads, indicating a clear comparative advantage for roadway locations. (Average scores were similar for all locations on aesthetics and preservation.)

- *Allocation of financial responsibility* for unplanned events and the *risk of damage and relocation*-the chance that such events will actually occur-figure significantly in financial risk. The greater the risk assumed by the private telecommunications company, the greater the potential costs associated with using a particular right-of-way and thus the lesser the value of access vis à vis other options.
- *Term of contract and length of right-of-way* also affect costs. The longer the contract, the greater the guaranteed use of the infrastructure installed. Although shorter contracts may be renewed and ultimately extend into long-term contracts, the risk of non-renewal increases financial risk. Similarly, the greater the length of the right-of-way accessed under one contract, the less expensive the transactions and negotiation costs per mile. This holds true for highway, railway/transit, and utility right-of-way, although certainly not for parcels assembled from individual landowners plot by plot. The longer the right-of-way accessed from a single agency, therefore, the greater the value per mile to the lessee in light of costs of multiple negotiations avoided. This rule of thumb may also distinguish between long-distance carriers, which have greater revenues and can afford greater compensation, and local carriers, which have shallower pockets and less revenue-generating telecommunications traffic over the infrastructure installed. Used this way, distance can be a criterion that allows lessors to vary prices systematically among lessees according to their willingness to pay (a function of the value they place on right-of-way access as well as their ability to pay).
- *Connectivity* includes both proximity to a viable distribution network (retail) and long-distance continuity, that is, connections to other right-of-way required for system completion. For example, in a study for the Massachusetts Turnpike Authority (MTA), Little (1990) noted that "potential demand for Turnpike right-of-way would be enhanced if interstate and state highways that interconnect with the MTA become available for fiber-optics occupancy."
- *Type of infrastructure* can figure in valuation in two ways: as an indication of (1) maintenance needs and thus the chance of safety problems or traffic disruption due to infrastructure maintenance; and (2) telecommunications volume and profitability of the infrastructure installed. In a number of cases, DOTs have denied longitudinal access to traditional utilities believed to pose safety problems but are considering or have granted access to fiber-optics providers because maintenance is limited and danger of combustion or similar hazards nonexistent. Infrastructure type can also be a proxy for revenue potential, probably the single most important determinant of right-of-way value. For example, access to right-of-way is assumed to be of greater value when used for fiber optics than for conventional copper cable because fiber optics have greater communications capacity and therefore greater revenue potential. Railroads often distinguish among infrastructure types in levying lease fees. In two cases reviewed for this study (BART and Leesburg), revenue was an explicit factor in compensation received by the public sector. The primary public participants are investors in these cases; revenue-sharing provides them with the means to pay off their capital outlays.

In addition, timing is an implicit yet important factor because demand for right-of-way of any kind strengthens or weakens as market situations shift, competition changes, and technology advances. In the shorter run, the speed with which a right-of-way lease can be negotiated and construction completed can be an overriding factor.

In 1988 the Rand Corporation conducted a study of fees charged for use of highway right-of-way. The results of that study were summarized in the WSDOT Feasibility Study and are presented in the table below. Based on the Rand study, WSDOT determined that charging for highway right-of-way in Washington would generate revenue on the order of \$50,000 to \$300,000 per year. This sum was not viewed as having a significant impact on transportation programs in general. WSDOT went on to conclude that

in summary, there appears to be minimal justification in charging for use of our right-of-way purely for the sake of increasing revenue to the Department. However, changing RCW § 7.44 to allow WSDOT to receive compensation in exchange for use of the highway will potentially allow WSDOT to reduce construction costs and construction time frames for its SC&DI communication network.

Fees Charged for Highway Rights-of-Way (1988)				
STATE	FACILITY TYPE	LOCATION IN RIGHT-OF-WAY	ENVIRONMENT	ANNUAL OR ANNUALIZED FEE (per mil)
California	Aqueduct	N/A	Rural	\$2850
Florida	Turnpike	Median	Rural	\$ 736
Georgia	Highways	Edge	Rural Urban	\$1000 - \$2000 \$5000
Illinois	Tollroad	Edge	Suburban	\$1500
Iowa	Highways		Urban Rural	\$4500 \$1500
Indiana	Tollroad	Median	Rural	\$1800
Massachusetts	Turnpike	Median	Urban	\$5000 - \$7500
New York	Throughway	Fence	Suburban	\$5280
Ohio	Turnpike	Median	Rural	\$1600-\$1850

Source: Rand Corporation

Since the Washington study was conducted, the growth in opportunities associated with the "information highway" has been explosive, and the value of access to public sector right-of-way for installation of fiber-optic networks has appreciated significantly. Indeed, many agencies are concerned that without a standard for valuation they could be "giving away the store" if they pursue the opportunity early, before much is known about the market for shared resource projects.

Massachusetts has framed the counter-argument in its policy statement, "Wiring Massachusetts." The State says that time is a critical variable and that it cannot afford to wait if it wants to remain economically viable, projecting that in the near future transportation of goods and services will rely heavily on telecommunications and that therefore the State *must* provide a friendly environment.

4.1.2 Valuation Methods

At least two parties are involved in determining compensation: the "buyer" (lessee) and the "seller" (right-of-way owner or lessor). The compensation finally agreed upon will be at or below the maximum value of the right-of-way to the lessee. To drive the best bargain for the public sector, the right-of-way owner must have a clear idea of the lessee's upper bound before negotiations conclude.

Public sector agencies have expressed an interest in methods that will help them estimate what lessees might be willing to pay for longitudinal access to highway right-of-way. In the absence of an established market, in which frequent trading establishes values that are openly reported, there are several viable approaches to valuation:

- Competitive auction;
- Valuation of adjacent land;
- Cost of next best alternative;
- Needs-based compensation;
- Historical experience; and
- Market research.

Aside from competitive auction, which may or may not elicit bids at "full market value," no single approach will yield a completely accurate right-of-way value. Several approaches used simultaneously will better pinpoint the range within which

market value falls.

Competitive Auction

If the number of potential buyers/lessees exceeds the number of contracts to be awarded, bidding in a competitive auction can be used to make a selection and to establish compensation levels. This is analogous to recent FCC auctions for available bandwidth. In its mirror image (that is, solicitation of low bids rather than high bids), public agencies practice auction-type bidding in selecting low-bid contractors for specified projects.

There are differences, however, between the rights auctioned by the FCC and the access to public right-of-way associated with a shared resource project—primarily safety considerations. Any auction for shared resources must be contingent upon meeting other specified conditions such as construction and maintenance practices to ensure safe highway operations. Further, a shared resource project will probably involve a long-term working partnership. Therefore, it will be more important to the awarding agency that it have control over the selection of vendors.

Shared resource projects also differ significantly from other auction situations because more than one lessee can be accommodated in the same right-of-way. In all cases documented to date in this study, the highway right-of-way can physically accommodate *all* lessees interested in longitudinal access. Thus, competitive auction may be a practical option only if access will be granted exclusively to a single lessee.

An auction approach is not without drawbacks. Of course, competitive auction generally assumes more than one potential bidder. The Little study (1990) concluded that the market for Massachusetts Turnpike right-of-way in 1990 was too weak to support an auction approach. And, like other high-bid awards, competitive auctions for highway right-of-way could act to exclude smaller, less well-capitalized firms if the access will be exclusive to the high bidder or compensation will not vary with firm revenues.

Missouri provides an example of auction-based valuation. The DOT, having already determined its fiber-optics needs, invited bidders to submit their best offer for a DOT-specified fiber-optics backbone geared to the needs of an advanced traffic management system. The opening bid had to provide at least six dark fibers along stated routes (bidders could not "cherry-pick" specific segments but had to install fiber for DOT along all selected routes). The winning contractor was to be that firm offering the best terms over and above this threshold requirement. In return for providing the state with telecommunications capacity, the winning bidder was granted exclusive longitudinal access for its telecommunications infrastructure alongside DOT's fiber-optics backbone system.

Valuation of Adjacent Land

Highway right-of-way derives part of its value from the same factors that determine the value of adjacent property, so it is only logical to use proximate real estate values as a guide to highway right-of-way values. In fact, Union Pacific Railroad, a potential competitive right-of-way supplier, has developed an extensive database of real estate values that it uses (along with other factors) to determine compensation for access to its right-of-way.

In a 1988 study, Hess et al. estimated that one-time payments for rural private land easements typically equal 50 to 70 percent of land value. Using a percentage factor of 70 percent and assuming a 20-foot construction corridor (that is, 2.4 acres per linear mile of right-of-way), the study's estimate of average one-time right-of-way costs for rural private land ranged from a high of \$5,160 per mile in New Jersey to a low of \$240 per mile in New Mexico.

It is misleading, however, simply to equate the real estate cost of easements on adjacent land with highway right-of-way value since this ignores cost differentials in installing telecommunications infrastructure in alternative locations. Using adjacent real estate values directly also overlooks the degree of uninterrupted access afforded by public right-of-way as well as the very real financial and administrative advantages of dealing with one agent rather than a number of individual landowners. Santa Fe Railroad explicitly incorporates this element in its computation of lease rates, which are based on the value of (adjacent) real estate.

More specifically, annual lease rate per right-of-way mile is computed as follows:

$$[\text{fair market value of land required}] * [\text{target rate of return} * \text{tax} * \text{continuity factor}]$$

Target rate of return is increased by tax liability on the income and a "continuity factor," which is the added premium for the railroad's ability to provide a continuous corridor for telecommunications infrastructure; these two factors together total about 20 percent (on average).

The premium paid for the advantages of right-of-way already under a single "landlord" may be significantly greater than 20 percent in some cases. In an article on valuing railroad right-of-way for abandoned systems, Miltenberger gives several

examples in which a significant premium was paid for an established right-of-way corridor. For example, Penn Central sold 21.85 miles of right-of-way (average width of 100 feet) to a pipeline company in 1989 at approximately 1.9 times the at-the-fence (ATF) value for the land. This was the lowest enhancement factor of the several cases Miltenberger describes. The savings from dealing with one landowner are substantiated by Miltenberger's data from authors such as Harris, who estimated that land costs per se were 55 percent and acquisition costs 45 percent of the total costs of acquiring 241 parcels for electrical transmission line easements in Mississippi and Tennessee.

The Little study for the MTA recommended four right-of-way fee strata based on its land value analysis. Using real estate values per square foot for sampled (representative) properties proximate to the Turnpike, assuming 2 square feet of property are equivalent to 1 linear foot of right-of-way, and annualizing value by assuming a 12 percent annual return, the consultants recommended the land zones and annual rents shown in the following table as the logical base for negotiating with prospective lessees.

Zone	Recommended Rent \$/linear foot/year
Inside Route 128 (Kneeland Street to Exit 16)	3.25
Route 128 to Route 495 (Exit 16 to Exit 11A)	2.75
Route 495 to Chicopee (Exit 11A to Exit 6)	1.75
Chicopee to NY State Line (Exit 6 to Exit 1)	1.00

Of course, rates negotiated in specific contracts may vary, depending on other factors such as access/egress, timing, and market conditions. The consultants also identified a fifth category: the tunnels under Boston Harbor, for which they used different methods of valuation (discussed later). In general, the consultants noted that their interviews and analyses indicated that \$1 per linear foot per year is a lower bound value for Turnpike right-of-way and that, "whether rational or not," they perceived a psychological barrier to going over \$5 per foot per year except in special circumstances.

Cost of the Next Best Alternative

Alternative right-of-way locations compete with highway right-of-way and, in so doing, set the upper boundary on highway right-of-way values. Cost of access to the next best location provides a benchmark for evaluating highway right-of-way access. It is not sufficient as a guide to highway right-of-way values, however, because other factors intervene, such as (1) costs of installation, which will differ among alternatives and within the highway right-of-way itself, and (2) timing or immediate availability, which can supersede other factors. Timing and ease of negotiation aside, the total cost of infrastructure installed in highway right-of-way generally cannot exceed the cost of the same infrastructure installed in the next best alternative location when all costs—including access payments and the value placed on less tangible factors such as security—are taken into account.

Thus, as a rule of thumb, the maximum value for highway right-of-way is equal to

(1) *total cost of infrastructure located along the next best right-of-way-including* payment for access as well as installation and equipment costs, transaction fees for land purchases, and discounted maintenance costs

minus

(2) *total cost of installing that same infrastructure along highway right-of-way-excluding* access payments but including transactions fees and discounted maintenance costs

plus

(3) *value of (non-monetized) advantages of highway location* (for example, those related to security, ease of negotiation, and so forth).

The next best alternative can be assembly of right-of-way from privately held parcels, installation along right-of-way owned by local public utilities (e.g., gas, electric) or in a DOT-defined utility corridor, installation along railroad right-of-way, or a combination of several of these options. Railroad right-of-way is a highly competitive alternative for highway right-of-way on routes between SMAs, for example, as an alternative to I-95 through Maryland. This is supported by telecommunications company use of such access.

In intra-SMA markets, however, railroad right-of-way is generally less competitive, particularly where it flows to older industrial areas and telecommunications expansion needs to flow to newer commercial business areas. For example, in the St. Louis SMA discussions focused on Missouri's upcoming shared resource project revealed telecommunications companies' interest in an SMA quadrant not accessed by railroad lines and hence their interest in roadway right-of-way access. In this case, the next best alternative might be assembly of easements from privately held parcels or access to already-crowded utility corridors.

Whatever alternative is "next best," cost group (1) minus cost group (2) equals the potential *out-of-pocket* savings from locating in a highway or interstate right-of-way. In addition to directly quantified out-of-pocket savings, valuation should take into account other less easily monetized factors that differentiate types of right-of-way; for example, probability and cost of accidental damage to telecommunications infrastructure from derailment, flooding, and other construction; differences in ease of access for repair and maintenance; likelihood of expansion that would require relocation of telecommunications infrastructure. These factors are incorporated in cost group (3), which is added to out-of-pocket savings to yield an estimated upper bound value for highway right-of-way. Hess et al. (1988) used this approach to estimate the value of several types of highway right-of-way compared with railroad right-of-way. Results of this study are summarized in the discussion of empirical evidence.

The Little study used several approaches to estimate fair market rental for the Boston Harbor tunnels, considered a unique resource not amenable to fees based on local land values. The consultants likened the tunnels to two routes each served by a pair of transmission towers. They estimated fair market value from three angles: comparable tower rental (a straightforward next best alternative), revenue generation, and comparable Massachusetts Bay Transportation Authority (MBTA) right-of-way (a historical precedent approach, discussed below).

At \$12,000 per tower per year, which the study estimated to be a fair tower rental rate, the rental for transmission service comparable with that offered by the pair of tunnels would be \$48,000—approximately \$4.80 per foot per year. The consultants confirmed the approximate magnitude of this rate by estimating another next best alternative scenario. Making assumptions about average daily vehicle traffic through the tunnels, the number of vehicles that were cellular-equipped, and the minutes of use per day in the tunnel, they estimated cellular revenues of \$600 per day or \$219,000 per year. Based on their estimate that a licensed carrier would charge 25 percent of revenues to carry another company's signal, that cellular traffic would generate \$54,750 per year for the carrier (that is, a telecommunications service choosing to use the tower-based option rather than fiber-optics installation in the tunnels would have paid close to \$55,000 per year for this next best alternative).

Needs-Based Compensation

Some right-of-way owners set target levels of compensation based on estimated needs rather than independent estimates of private partner willingness to pay, particularly in barter arrangements. They will know if they target too high if no potential lessees express an interest or if potential lessees come back with lower offers; they will not know if they target too low.

Estimated needs can include telecommunications infrastructure to support public agencies in addition to the right-of-way owner, and they can include equipment as well as fiber-optics cable, thus boosting the needs-based target level of compensation. Maryland DOT's shared resource arrangements, for example, focused on statewide telecommunications needs rather than being limited to DOT needs alone.

If needs are underestimated or right-of-way owners are reluctant to bargain for all their telecommunications needs, lessors using needs-based compensation may receive less than if they had used another approach to valuation. However, it may be useless to bargain for compensation beyond public sector capacity needs in many shared resource arrangements. If regulatory restrictions prohibit state agencies from receiving cash payments and, as well, from leasing telecommunications services or even excess conduit or fiber-optics capacity, there is no incentive to push in-kind compensation beyond public sector telecommunications needs. By default, therefore, compensation is based on public sector needs rather than estimates of market value.

Historical Experience

Historical precedent, where data are available, may provide a much easier approach to valuation than comparative bottom-up cost comparisons such as those described by Hess et al. (1988); however, data from completed shared resource arrangements may understate the lessees' willingness to pay. That is, the terms of completed agreements indicate only that private lessees were willing to pay a given level, but the compensation paid may be less than they were prepared to pay. Nonetheless, historical experience is a better guide than none at all and certainly provides a starting point for negotiations.

Since documented compensation rates vary according to objective factors and according to needs and expectations of the parties involved, historical analysis should include information on right-of-way and lessee characteristics as well. Conrail developed a systematic approach to valuation based on historical data, drawn from its own right-of-way leases. The company assembled information from past contracts on lease payment and six associated factors:

- Right-of-way location (rural/urban, whether it connects two major centers, whether it is vital to the lessee's system),
- Lessee's business (wholesale, retail, or non-communications business),
- Purpose of telecommunications line (inter-LATA or intra-LATA),
- Number of miles leased,
- Competing right-of-way options,
- Number of fibers to be installed.

Conrail evaluated the characteristics associated with past agreements using a scale of +1 to +10 for the first four factors (+10 indicating high lease value), a scale of -10 to +10 for competing right-of-way options, and a scale of +1 to beyond +10 for number of fibers. Based on the observed relationships between negotiated lease rates and the point value of the factors associated with each lease, the company worked backward to an estimated dollar value for each factor-point. Conrail uses this historically based matrix of values, which is pegged to the Consumer Price Index to keep pace with inflation, to set annual lease rates for new contracts.

Little (1990) used historical precedent to support its other two estimates of the value of the Boston Harbor tunnels. Referring to the fee of \$5.50 per foot per year charged by the MBTA for comparable right-of-way along its rail routes, Little noted its comparability to the other estimates and recommended that the MTA charge the same rate as the MBTA for tunnel right-of-way. If they were priced at this rate, the 10,722-foot-long tunnels would garner more than \$58,000 per year in rental fees.

Market Research

Ultimately, right-of-way value is based on lessees' willingness to pay for longitudinal access. The approaches to valuation described here are attempts to (1) infer lessee willingness to pay by analyzing the same factors they use in evaluating right-of-way (for example, costs of next best alternative) or using information that reveals their willingness to pay in other circumstances (historical evidence), or (2) force prospective lessees to reveal their current willingness to pay through competitive bids. Direct contact with potential lessees—that is, market research—may also provide information on willingness to pay as well as identify contract conditions and other factors that shape potential demand for right-of-way.

Palmer Bellevue (1994) used market research as a significant portion of its market feasibility study for the New York Thruway Authority. The consultants surveyed 24 private sector telecommunications and cable companies; they also contacted 12 non-telecommunications entities, including various public sector agencies that use telecommunications services.

Respondents were queried about the level and type of interest in Authority-provided facilities, and the type of facilities desired. The consultants explored several possible approaches to leveraging the Authority's right-of-way:

- Direct lease of right-of-way access to private telecommunications firms;
- Authority installation of ducts and lease of duct capacity; or
- Authority installation and lease of dark or light fiber.

The initial survey was followed by a request for information (RFI) from potential "customers" to determine more precisely specific characteristics of demand such as routes, special requirements, time frame, and willingness to pay.

Such market research, although certainly useful, can also be incomplete or misleading for two reasons:

- Respondents are asked about *anticipated* behavior, rather than historical behavior, and their reactions may change when the proposed situation actually comes into being.
- Because respondents may eventually become lessees, there is a strong incentive for them to understate their willingness to pay. Considered strategically, a savvy potential lessee would indicate an amount just high enough to ensure the Authority's continued pursuit of right-of-way partnerships but not as high as the maximum it is actually willing to pay.

Thus, in most instances, market research alone is unlikely to provide sufficient information on right-of-way value. Palmer Bellevue acknowledged these shortcomings and, in fact, pursued other approaches such as case studies of other highway and railroad lease arrangements (that is, historical evidence).

4.1.3 Empirical Evidence

Empirical evidence to establish benchmarks for right-of-way valuation derives from several sources:

- Highway right-of-way values inferred by Hess et al. (1988), using a next best alternative approach,
- Lease rates charged by independent authorities (toll and turnpike), and
- Shared resource agreements recently negotiated by state and local agencies.

Next Best Alternative

Hess et al. (1988) inferred the value of highway right-of-way by comparing fiber-optics installation costs in roadways and on railroad right-of-way and private land. The authors collected information on installation costs from six telecommunications companies as well as engineering firms and cable manufacturers. They documented costs in five categories—engineering, right-of-way acquisition, cable procurement, cable installation (placement, splicing, etc.), and regenerator procurement—and took into account differences in cost according to location in interstate freeways, non-interstate highways, railroads, and private land. Cost data, even within a type of right-of-way, showed wide variation; thus the results are very dependent on the specific values selected by the authors from the ranges of values.

The table below indicates possible values for roadway right-of-way based on comparisons among locations. Caution is advised in using these values, not only because they are based on 1988 data and exclude installation of conduits now more commonly used but also because they are based on representative values, which may or may not be valid in individual cases.

Costs of Installed Fiber-optics Infrastructure by Location					
	Interstate Highway^a		Non-Interstate Highway^a	Private Land^b	Railroad^c
	Median	Fence Line			
Total Installed Cost (one-time, \$000 per mile)	\$44.8	\$50.8	\$61.8	\$57.8	\$56.8
Compared with Interstate Median	-	+6.0	+17.0	+13.0	+12.0
Compared with Interstate Fence Line	-6.0	-	+11.0	+7.0	+6.0

Notes:

^a excludes land acquisition costs.

^b includes land acquisition costs of \$1,000 per linear mile of right-of-way.

^c includes one-time acquisition costs of \$12,000 per mile.

According to this set of computations, longitudinal access to interstate highway right-of-way median could be worth a \$12,000 one-time payment if the next best alternative were a railroad right-of-way. On the other hand, location in a non-interstate right-of-way may present no advantages over the next best alternative unless that alternative is private land and transactions costs (not considered here) amount to more than \$4,000 per linear mile (that is, the difference between installed costs of \$61,800 on a non-interstate exclusive of lease costs and \$57,800 on private land including purchase or easement costs).

Rates Charged for Longitudinal Access to Right-of-way

Although most shared resource agreements negotiated by state DOTs involve in-kind compensation, independent tollroad and thruway authorities and at least one state DOT have histories of cash compensation that provide empirical data on right-of-way values. The following table presents an updated and somewhat expanded version of the data presented by Hess et al. (1988) on costs of accessing highway and aqueduct rights-of-way. It is clear that there is a significant variation in fees that cannot be explained solely in terms of location within the right-of-way or urban/rural context. These differences are (presumably) attributable to region of the country (and associated variations in land values), competitive conditions such as the proximity and characteristics of the next best alternative, and bargaining strength of the contractual parties involved, as well as market needs of the lessees involved.

Fees Charged for Roadway and Aqueduct Rights-of-Way, \$ per mile per year							
STATE	FACILITY	ROADWAY					
		Rural		Suburban		Urban	
		Median	Edge	Median	Edge	Median	Edge
California	Aqueduct						\$2,850
Florida	Turnpike	\$736 ^a					
Georgia	Non-Interstate Highways		\$1,000-2,000 ^b				\$5,000 ^b
Illinois	Tollroad				\$1,500		
Iowa	Highways	\$1,500 ^c				\$4,500 ^c	
Indiana	Tollroad	\$1,800 + capacity ^d					
Massachusetts	Turnpike					\$5,000-7,500	
New York	Thruway				\$5,280		
Ohio	Turnpike	\$1,600-1,850 + capacity ^d					

Notes:

^a Fees no longer apply because DOT has taken over this roadway and cannot charge fees.

^b Actual rate in rural areas depends on average daily traffic; fees are considered reimbursement for administrative costs, including permitting and insurance factor.

^c The Iowa DOT reserves the right to negotiate the fee charged for occupancy dedicated solely to state governmental use (Iowa Accommodation Policy, §115.24(12)c).

^d These are the rates negotiated in 1985 with Litel; contract gives the Turnpike the option of free utilization of a stated amount of capacity at any time in the future.

Lease fees are also clearly related to the year in which contracts were negotiated. For example, Ohio Turnpike's reported fee of \$1,600 is part of a 25-year contract negotiated in 1985 with Litel; new negotiations are under way that will presumably involve higher lease rates. Indiana Toll Road's rate of \$1,800 is similarly from its 1985 contract with Litel, a rate set by simply adding \$200 to the rate Ohio negotiated in the same year. Officials indicated that any lease negotiated now would be at a higher rate.

Railroad lease rates, which often determine the cost of the next best alternative, are generally considered proprietary; however, Little (1990) reported rates for several lines contacted in the course of its study. For example, D&H Railroad charges \$1 per foot per year on average. Occupancy is permanent but payment is for up to 25 years. In contrast, Central Vermont Railroad charges \$2-4 per foot per year, depending on the area and time of installation.

As of 1990, the MBTA defined five fee zones with charges ranging from \$1.50 to \$5.50 per foot per year for access to its transit right-of-way. Zone 5, from South Station to the Rhode Island state line, is negotiated case by case. The other four zones are defined according to location in the rail system. The highest rate is for right-of-way in the urban core (Boston-Cambridge, including the airport); the lowest for commuter rail lines outside the I-495 beltway (the outer beltway).

The New Jersey Turnpike considered a policy based on a standard price for access to its right-of-way regardless of surrounding land density (rural, suburban, urban). The rate would have depended only on whether the lessee were a "lead" investor or not. The first lessee or lead investor would build four single ducts or a single duct with four inner ducts. This carrier could occupy two ducts for its own use, paying the Turnpike a lease fee of \$1 per foot per year. The third and fourth ducts would be reserved for subsequent carriers, which could access each duct for a lease fee of \$2 per foot per year paid to the Turnpike. If a fourth carrier were interested in right-of-way access, it would become the lead investor for a new set of four inner ducts (or four single ducts) and the process would repeat itself. The Turnpike Authority did not plan to receive in-kind fiber-optics capacity in consideration for right-of-way access.

Recent Shared Resource Agreements

Recent shared resource agreements involve in-kind compensation; some also include cash compensation. In some cases,

longitudinal access to highway or roadway right-of-way is limited to one lessee; in others, all qualified parties are permitted access. The level of compensation varies significantly from case to case.

For example, in leasing access to 75 miles of a major inter-SMA highway to two private companies, Maryland DOT gained 48 fibers, of which 24 are dark and 24 lighted. Missouri granted exclusive access to one firm over a longer distance (although this was a state requirement rather than the telecommunications partner's preference), and gained six lighted fibers including maintenance and technological upgrading over a 40-year period. Missouri's system involves at least some median placement; Maryland's is entirely in the median.

Significant differences between these two arrangements that might boost the per-mile value of Maryland right-of-way include the following:

- Maryland disaggregated its fiber-optics backbone geographically, allowing bidders to limit their investment to right-of-way routes that interested them; Missouri required all bidders to lay fiber for the full system as designed.
- Maryland's right-of-way for this agreement runs between two major urban SMAs (Washington, D.C., and New York City), where telecommunications redundancy has positive value, although railroad and other utility rights-of-way are competitive options.

Value-enhancing aspects of Missouri's arrangement include the following:

- Exclusivity to one telecommunications firm, although this firm is leasing access to other telecommunications firms on its lines.
- Limited or no serious competition from alternative right-of-way locations such as railroads in the areas of greatest interest to the bidders; i.e., within the St. Louis SMA.

In contrast, the arrangements concluded by BART and by the City of Leesburg, Florida, include cash compensation in addition to fiber-optics capacity; however, both public agencies are investing their own capital in their projects. Leesburg is providing all capital investment for the project; the initial cash revenues will be used to repay capital and, thereafter, revenues will be split evenly between the City and its telecommunications partner.

BART and its telecommunications partner are each investors in the project, but their capital investments are segregated into two separate activities. MFS Network Technologies is investing \$3 million to construct conduit that it will lease to private carriers who will pull their own fiber. BART obtains \$45 million in capital improvements including an integrated fiber network (48 fiber-optics strands including electronics and software) from MFS. In consideration for MFS access, BART receives 91 percent of the rental income from the MFS-managed conduits. BART anticipates that these revenues will cover all but \$2 million of the cost-including operations, maintenance, and interest on debt-for its train control and communication system over the 15-year period; they may cover even more.

The BART agreement also involves Caltrans as a "silent" partner. Of the 100 miles of right-of-way included in BART's current and planned extensions, 25 miles are actually owned by Caltrans, which conceded control but not ownership to BART. Thus, Caltrans is also a lessor and, in consideration of the airspace lease it negotiated with BART, will receive a portion of the revenues generated from MFS conduit leases after BART has fully paid for its telecommunications system.

Caltrans also receives in-kind compensation-4 of BART's 48 strands of fiber-optics along the full 100 miles of the BART system, with access at 15 strategic locations. In fact, this in-kind compensation was the dominant attraction for Caltrans (which Caltrans has estimated as equivalent to \$8-12 million in avoided costs for independent construction of a Caltrans infrastructure or \$960,000 per year in lease costs for comparable fiber-optics capacity).

4.2 TAX IMPLICATIONS OF SHARED RESOURCE PROJECTS

Federal tax considerations may effectively preclude a public agency from receiving compensation for access to the public right-of-way. Federal tax law may dissuade such use in at least two ways: (1) the threat of income tax liability and (2) the threat of losing tax-exempt status for bonds issued to finance the project.

Section 115 of the U.S. Internal Revenue Code excludes "income derived from any public utility or the exercise of any essential governmental function" from the definition of gross income. Generally speaking, states and municipalities are not subject to federal income taxation; however, the U.S. Supreme Court has held that revenue from businesses that constitute a departure from usual "governmental functions" is not exempt from the imposition of income tax. In *Iowa State University of Science and Technology v. United States*, 500 F.2d 508, 523 (Ct. Cl. 1974), the court held that the operation of a commercial television station by a state university was not an "essential governmental function," and consequently that revenues derived from the venture were subject to federal tax. The same conclusion might be reached under various states' income tax laws.

Consequently, a DOT may face federal income tax liability on revenues earned from a shared resource project, depending on how the project is structured and how these revenues are ultimately classified.

Federal tax laws relating to the issuance of tax-exempt municipal obligations may also discourage joint ventures between public and private entities. If private involvement in a project exceeds the levels established by federal law, the project will not be eligible for tax-exempt financing. Similarly, adding a private component to an existing project may jeopardize the tax-exempt status of the bonds issued to finance the existing public project.

In projects in which infrastructure facilities are funded with the proceeds of tax-exempt bonds, not only is the income potentially subject to taxation, the bonds may also lose their tax-exempt status. Federal tax laws state that if it is expected that a private entity will benefit from more than a minimal amount of the proceeds of a municipal financing, and that the private entity will provide security or payments exceeding more than a minimal amount of the debt service on that financing, then that financing may not be issued on a tax-exempt basis:

Generally speaking, if a facility built with tax exempt bond funding is later used for a purpose not qualified for tax exempt financing, the person using the property for the non-qualified use will lose the right to deduct rent, interest or equivalent amounts with respect to that proportion of the property that has been converted to a non-qualifying use. Amounts received by a municipality resulting from such a use of a facility might be held to fall outside the exemption of 26 U.S.C. § 115 discussed above, and would therefore be subject to tax.... Furthermore, the bonds would lose their tax exempt status and the bondholders would be required to pay tax on any interest they received. Bond indentures typically guard against this sort of eventuality by making loss of tax exempt status an event of default.

In one of the ITS projects examined for this study, the San Joaquin Hills Transportation Corridor in Orange County, California, the need to comply with tax-exempt financing strictures was cited as a significant issue to be considered before the tollroad agency enters into any shared resource arrangement. The project was financed principally by more than \$1.1 billion in revenue bonds secured only by tolls from the Corridor. As part of the first tollroad system in southern California, with more than 17 miles of uninterrupted fiber-optic cable stretching through premium Orange County real estate near business centers, the Corridor is a prime candidate for a shared resource project. However, the potential effect on the tax status of construction bonds was one of the factors deterring the public agency from pursuing a shared resource approach. Before any such arrangement is considered, the agency will have to carefully examine the impact on the tax-exempt status of its bond financing. Income from a shared resource project could exceed the thresholds discussed in the following section and therefore jeopardize the tax-free status of the bonds.

The federal tax analysis will be greatly affected by the structure of the shared resource project, and case-by-case analysis will be necessary. The following discussion sets out the general provisions of the tax law in this area.

4.2.1 Current Law

The restrictions on the use of tax-exempt obligations to finance various activities depend on whether such obligations are "governmental bonds" or "private activity bonds." Governmental bonds are obligations of a state, or political subdivision thereof, which are used for governmental purposes or which are secured by the credit of the governmental issuer. Private activity bonds are obligations of a state, or political subdivision thereof, which are used for private purposes *and* are secured by an interest related to such private purposes.

Governmental bonds are tax-exempt and may be used for any valid purpose of the issuer, including the construction and operation of a freeway or tollroad. Interest on private activity bonds is *not* exempt from federal income taxation. Therefore, the factors leading to classification of the obligations as private activity bonds must be reviewed carefully in any shared resource project, and any tax-exempt financing of a project must be structured so that the obligations are governmental bonds.

Bonds are reviewed in two dimensions: quantitative tests that determine whether a bond is deemed to be a private activity bond, and reviews of public-private arrangements such as private management contracts to determine whether private benefits are dominant in the bond-financed activity.

Tests for Private Activity Bonds

Obligations are private activity bonds if they meet *either* the "General Private Activity Test" or the "Private Loan Financing Test." These tests operate as described in the following subsections.

General Private Activity Test

Under the *General Private Activity Test*, bonds are private activity bonds if

- More than 10 percent of the proceeds of a bond issue are to be used for any private business use (*Private Business Use Test*),

and

- Payment of the principal of, or the interest on, more than 10 percent of the proceeds of such issue is directly or indirectly secured by any interest in (1) property used or to be used for a private business use, or (2) payments in respect of such property (*Private Security or Payment Test*).

The percentages are reduced from 10 percent to 5 percent if the private business use is not related to any governmental use of the proceeds, or if the private business use is disproportionate to a related governmental use, thus making it even more difficult to maintain tax-exemption for the debt financing.

Even where private business use and private payments do not exceed the 5 or 10 percent threshold under the General Private Activity Test for tax-exempt status, a new bond issue may be classified as taxable private activity bonds if the private portion of the issue exceeds specified maximum dollar limits referred to as the "Nonqualified Amount."

Private Business Use Test

The question of whether private use is "related" to governmental use in the shared resource context has not been addressed by the Internal Revenue Service (IRS). Recent proposed regulations (described later) attempt to provide some guidance. They indicate that whether a private business use is related to a governmental use is determined case by case, emphasizing the operational relationship between the two uses.

Use of a facility by a private party for the same purpose as use by the government is considered to be a related use, and subject to the more liberal 10 percent test, so long as the government use is not insignificant. If a private business also uses a facility for some purposes unrelated to government use, the private business will be considered "related" so long as the government-related purpose is not insignificant. In general, a facility used for a related private business must be located in or adjacent to the governmentally used facility.

In the simple example offered by the proposed regulations, a privately owned pharmacy in a government-owned hospital is not an unrelated use simply because the pharmacy also serves individuals not using the hospital. In the shared resource context, it is arguable that the 10 percent threshold is appropriate in most cases, since the telecommunications facilities will be shared by government and private users or will be physically related.

Private Security or Payment Test

Rulings and legislative history suggest that the Private Security or Payment Test is to be applied very broadly. That is, under this test, both direct and indirect payments made by any person (other than a governmental unit) are counted in computation of the percentage that may trigger taxable status. These payments are counted whether or not they are formally pledged as security or directly used to pay debt service on the bonds.

Even if the private payments are not expressly allocated to debt service, the Private Security or Payment Test may still be met because of an "underlying arrangement" between the parties, where the private party provides revenues in excess of the percentages given above. In the typical example of an underlying arrangement, a city issues bonds and lends the proceeds to developers to finance industrial buildings. Neither the payments by the developers nor the mortgages on the buildings are pledged directly to the bonds. It is anticipated that over the term of the bonds, however, the principal and interest payments made by the developers will be approximately equal in present value to the total debt service on the bonds. In such a situation, an underlying arrangement is inferred. The payments by the developers are treated as the actual security for the bonds, and the Private Security or Payment Test is met, thus classifying the debt as taxable private activity rather than tax-exempt governmental bonds.

An underlying arrangement may result from separate agreements between the parties or may be determined on the basis of all of the facts and circumstances surrounding the issuance of the bonds. An underlying arrangement will always be inferred if the payments made by the user of the bond-financed facility and the debt service on the bonds are approximately equal in present value. Other indications of an underlying arrangement are that the payments made by the private party are material and that the identity of the private party can be determined with reasonable certainty at the time of issuance of the obligation.

IRS Notice 87-69 (October 26, 1987) provides guidance to issuers in applying the Private Security or Payment Test. The Notice provides that, subject to certain adjustments (described below), the present value of the payments received from the private user is compared with the present value of the debt service to be paid over the term of the issue to determine whether the applicable percentage (5 percent or 10 percent) has been exceeded.

The adjustments are made in computing the payments received from the private user and the debt service on the obligations. Private payments does *not* include the portion of any payment that compensates the bond issuer for ordinary expenses for operation and maintenance of the property. Also, the debt service on an issue includes reasonable credit enhancement fees which are taken into account in computing the yield on the issue but does not include any amounts to be paid from proceeds of the issue. For example, debt service does not include accrued or capitalized interest or other amounts to be paid with proceeds of the issue (e.g., from proceeds in a reserve fund).

Private Activity Volume Cap

Even where private business use and private payments do not exceed the 5 or 10 percent threshold under the General Private Activity Test for tax-exempt status, a new bond issue may be classified as taxable private activity bonds if the private portion of the issue exceeds specified maximum dollar limits referred to as the "Nonqualified Amount."

The Nonqualified Amount is computed as the lesser of

- The proceeds of a municipal obligation which are used for a private business use

and

- The proceeds of such issue with respect to which there are payments which count toward the Private Security or Payment Test.

If the Nonqualified Amount does not exceed the applicable percentages (either 5 percent or 10 percent) but *does* exceed \$15 million, the municipal obligation will still be considered a private activity bond, unless the issuer obtains a volume cap allocation for the municipal obligation in an amount equal to the excess of the Nonqualified Amount over \$15 million.

Private Loan Financing Test

Obligations also may be deemed to be private activity bonds if they meet the "Private Loan Financing Test." Section 141(c) of the Internal Revenue Code states that an issue meets the Private Loan Financing Test if the lesser of

- 5 percent of the proceeds of the issue, or
- \$5 million

is to be used (directly or indirectly) to make or finance loans to persons other than governmental units.

The table at the end of this section summarizes the relationships among the tests that determine whether a bond is classified as private or governmental activity. In short, a bond qualifies as a tax-exempt governmental activity bond only if the answers to all four test questions are "no," or if there is a "yes" response to one (but not both) of the questions in the General Private Activity Test.

Private Management Contracts

Another example of a situation which appears to deal with a public facility but which under the tax law might be deemed to provide a private benefit, involves the use of a management contract as part of the transaction. For example, a highway agency might find it desirable to finance the construction of an electronic toll collection system on its roadways. If the agency does not have employees who are skilled in managing the day-to-day operations of such a facility, the agency might wish to enter into a management contract with a private operator which is so experienced.

This arrangement, if not carefully structured, may jeopardize the tax-exempt status of the obligations issued to finance the system or, conversely, restrict an issuer's ability to employ an independent party to manage and operate the facilities financed with the proceeds of tax-exempt obligations. Unlimited use by a private party under a management contract is considered a private business use and will result in the bonds' classification as private activity bonds, except in certain specific situations. Federal income tax laws provide the following guidelines to indicate when a non-governmental person's use of a bond-financed facility pursuant to a management contract will not be treated as a private trade or business use—that is, will not violate the conditions for governmental bonds:

1. The term of the management contract does not exceed five years (including renewal options exercisable by the

- private party);
2. At least 50 percent of the compensation to any manager other than a government unit is on a periodic, fixed-fee basis, and no amount of compensation is based on a share of net profits; and
 3. The government unit owning the facility may terminate the contract (without penalty) at the end of any three-year period.

Summary Table: Determination of Bond Tax Status				
GENERAL PRIVATE ACTIVITY TEST		PRIVATE ACTIVITY OR VOLUME CAP	PRIVATE LOAN FINANCING TEST	TAX STATUS OF BOND
<i>Private Business Use Test:</i> Are more than 10% of bond proceeds* used for private business?	<i>Private Security or Payment Test:</i> Does private business pay or secure payment of principal or interest on more than 10% of bond proceeds*?	Does private portion of bond proceeds exceed \$15 million, or does private sector pay or secure payments on more than \$15 million of bond proceeds?	Are more than 5% of bond proceeds or more than \$5 million going to be used to make or finance loans to persons other than governmental units?	
yes	yes	yes or no	yes or no	Private activity bond -NOT tax exempt
yes or no	yes or no	yes	yes or no	Private activity bond -NOT tax exempt
yes or no	yes or no	yes or no	yes	Private activity bond -NOT tax exempt
yes or no	NO	NO	NO	Governmental bond - tax exempt
NO	yes or no	NO	NO	Governmental bond - tax exempt

*This percentage applies when private business use is related to governmental use of the bond proceeds; otherwise, the threshold percentage for these tests is 5%.

Rules Applying to Bonds Issued Prior to 1986

The restrictions relating to the private use of proceeds of municipal obligations first appeared in the Internal Revenue Code in 1968. Thus, for bonds issued before May 1, 1968, the fact that a private entity benefited from the proceeds of municipal obligations did not adversely affect the tax-exempt status of such obligations.

For bonds issued on or after May 1, 1968, and on or before August 15, 1986, bonds deemed to be "industrial development bonds" (the predecessors of private activity bonds) were not tax exempt. The tests used to determine if bonds were industrial development bonds were similar to the tests for private activity bonds with one key difference: the level of private use and private security allowed under previous law was 25 percent, rather than the 5 percent or 10 percent limitation under current law.

Proposed Private Activity Bond Regulations

On December 29, 1994, the IRS issued proposed regulations which provide guidance with respect to private activity bonds. The IRS requested written comments through the end of April 1995 and held a public hearing on the proposed regulations on June 8, 1995. They are likely to be revised to reflect some of the written and oral comments received by the IRS (no final regulations have yet been adopted). The provisions of the final regulations will apply to bonds issued 60 days after their adoption.

The proposed regulations provide guidance on facilities which are used both publicly and privately. For example, in a mixed use facility-a facility that consists of (1) two or more discrete portions, or (2) an undivided ownership interest in an output facility or in a utility system such as a fiber-optics network-the measurement of the use of proceeds allocated to a discrete portion is determined by treating that discrete portion as a separate facility.

The proposed regulations provide that the determination of whether an issue constitutes private activity bonds is based on the issuer's "reasonable expectations" as of the issue date. An issue also constitutes a private activity bond if the issuer takes a deliberate action, subsequent to the issue date, that causes the Private Activity Bond Tests to be met; an involuntary action against the will and without the cooperation of the issuer is not a deliberate action.

The proposed regulations also expand the categories of qualified management contracts to include (1) contracts with terms not exceeding the lesser of 15 years or 50 percent of the useful life of the property if all the compensation is based on a periodic fixed fee; and (2) contracts with terms not exceeding the lesser of 10 years or 80 percent of the useful life of the property if at least 80 percent of the annual compensation is based on a periodic fixed fee.

In general, the proposed regulations favor shared resource projects in that they liberalize the use of management contracts and they provide clearer guidance with respect to the identification and quantification of private use.

4.2.2 Structuring a Shared Resource Transaction to Minimize Tax Issues

Municipal obligations must meet *both* the Private Business Use Test *and* the Private Security or Payment Test in order to be characterized as private activity bonds subject to taxation. Thus, if a transaction is structured so that it fails either test, the bonds will remain tax exempt. For example, if the transaction involves payments to the public agency of less than the minimum 5 or 10 percent of the bond amount, the bonds will be characterized as tax-exempt governmental bonds, regardless of the amount of private business use.

Failing the Private Security or Payment Test

Under the Private Security or Payment Test, any actual payments from the private telecommunications company to the public agency, as well as the fair market value of any services or other consideration received by the public agency from the private telecommunications company as payment for use of the public agency's right-of-way must be considered. As long as the present value of such payments and services does not exceed the threshold percentage (5 or 10 percent, whichever is appropriate) of the present value of the total debt service paid with respect to the municipal obligations issued to finance the public facility (and making the appropriate adjustments, as described above), the tax-exempt status of the municipal obligations will not be jeopardized.

Failing the Private Business Use Test

If a transaction is structured so that it fails the Private Business Use Test, the municipal obligations will be characterized as governmental bonds, regardless of the amount of private security or payments. The key issues involve (1) determining whether the private party is in fact using the bond-financed facility, and (2) if it is, finding a reasonable method of allocating that facility between the public and private uses.

For example, a situation might exist in which a municipality that owns an existing right-of-way uses the proceeds of tax-exempt bonds to finance highway improvements on that right-of-way. The fiber-optics network will be installed below the road surface. Under these circumstances, it can be argued that there is no private use of the bond-financed facility, which consists of the improvements to the surface of the right-of-way. Even if the fiber-optics operator has some use of the surface area of the right-of-way (e.g., electrical components, or the right to enter the surface area in order to maintain the fiber-optics system), it is likely that the amount of such use, using the allocation methods described below, will fall within the minimal amount of private use which is permitted under federal tax laws.

If the tax-exempt bond proceeds are used to acquire the right-of-way as well as to build the improvements upon it, then the construction of the fiber-optics network below the surface does constitute use of the bond-financed facility. It becomes necessary to allocate the bond proceeds to the various components of the bond-financed facility.

Federal tax laws permit the use of any reasonable, consistently applied accounting method to allocate proceeds to expenditures. Pursuant to this guidance, it is reasonable to allocate bond proceeds to the right-of-way in an amount equal to the purchase price of the right-of-way. Since the fiber-optics network uses only a portion of the right-of-way, however, it is necessary to break down the total cost of the right-of-way into its various components. This determination is made through the services of experts who provide appraisals of the relative values of the various components of the right-of-way. It is likely that such appraisals would assign relatively high values to the surface of the roadway and correspondingly low values to the subsurface. Therefore, it is probable that at the end of this process it will be determined that although the fiber-optics network constitutes a use of the bond-financed facility, based on the relative values of the surface and subsurface of the roadway, the use is less than the threshold proportion of the bond proceeds.

In some situations it may be possible to minimize the amount of proceeds used by the private party by arguing that only the incremental costs of a project are allocable to that private party. For example, if a municipality intends to install a fiber-optics conduit for its own use and uses bond proceeds to install a somewhat larger conduit to accommodate a private user, it seems

reasonable to allocate to the municipality all the costs it would have incurred to install a conduit of a size sufficient for its own use and to allocate only the incremental costs of a larger conduit to the private use. Using this analysis, it may be possible to conclude that the amount of bond proceeds used by the private party does not exceed the threshold percentage of total bond proceeds.

4.3 OTHER FINANCIAL ISSUES

Although ROW valuation and bond status were in the forefront of financial issues, public officials identified two other topics that should be considered: valuation of private resources and public sector costs.

4.3.1 Valuation of Private Resources

Valuation of the public sector resource-the right-of-way-is one side of the valuation issue; the other is valuation of the resources provided by the private sector. Both are important in determining whether the deal is "fair" to the partners involved.

Of course, there is no issue of valuation of private sector compensation in a shared resource project when no barter is involved; cash lease or sale transactions are already monetized and valuation is an issue only for the public sector resources. But many projects being explored are based entirely or in part on barter arrangements in which the private sector installs capacity beyond its needs and dedicates the surplus to public sector uses.

The capacity that the private partner provides for public purposes can be valued in a variety of ways:

- *Avoided cost*, that is, cost of that infrastructure if the public sector were to install equivalent capacity as an independent project;
- *Out-of-pocket cost* to the private provider of installing the incremental infrastructure dedicated to public purposes;
- *Market value* of the incremental infrastructure if leased or sold to a commercial user;
- *Use-value* to the public sector of the infrastructure provided (that is, the opportunity cost of *not* having the communications capacity provided).

Of the cases reviewed for Task A, those that explicitly addressed the issue of valuing private sector in-kind compensation relied on computation of avoided cost or the cost that the public sector would have incurred had it undertaken to build its own telecommunications infrastructure. For example, Caltrans' project development branch prepared an avoided-cost analysis that documented the millions of dollars saved by its receipt of four fiber-optics strands in the BART-MFS shared resource arrangement. Similarly, Missouri DOT estimated the cost of its planned advanced traffic management system before it decided to enter a shared resource agreement for provision of this infrastructure.

4.3.2 Public Sector Support Costs

In determining participation in shared resource projects, public agencies should not lose sight of the direct out-of-pocket costs they will incur. These costs are a form of investment in anticipation of greater net benefits, essentially a leveraging of public expenditure on administrative and management costs in order to reduce the costs of public communications infrastructure and operating expenses. Although the public sector support costs are generally assumed to be much less than the value of benefits received, a true estimation of net gains to the public entails realistic estimation of these costs, including the following:

- Preliminary evaluation of private sector interest; for example, pre-bid meetings;
- Specification of project components and formulation of RFPs or other solicitations;
- Screening and evaluation of private sector bids and negotiation;
- Management of construction and subsequent contractual relationships.

The research team's inventory of shared resource projects and other relevant cases revealed no example of explicit computation of these costs, which should be subtracted from anticipated compensation to derive a true estimate of net benefits to the public sector.

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U.S. Department of Transportation

5.0 PROJECT STRUCTURE ISSUES

Shared resource projects can be structured in a number of ways, with variations in responsibilities for installation, ownership, and operation as well as the form of benefits and privileges granted to each partner. The focus group highlighted the structural issue of exclusivity for more detailed research, that is, whether access to highway right-of-way should or could be limited to a single private partner.

5.1 EXCLUSIVITY

In structuring a shared resource project, the question of whether the right to install and operate telecommunications facilities longitudinally in the public right-of-way should be exclusive must be addressed at the outset. For this discussion, "exclusive" means that during the term of the right, the public agency will not grant a right to another telecommunications facility to occupy the same section of the public right-of-way; i.e., only one longitudinal installation of a facility will be allowed in any particular segment of the highway.

Shared resource agreements may (1) limit longitudinal access to public rights-of-way to a single private sector partner (that is, grant exclusivity), (2) require access for all interested firms that meet specified qualifications (e.g., fiber-optics installations), or (3) prescribe a structure between these two ends of the range. Stated more technically, the term "exclusive" means that during the term of the right, the public agency will not grant a right to another telecommunications facility to occupy the same section of the public right-of-way; i.e., only one longitudinal installation of a facility is allowed in any particular segment of the highway.

In making this determination, the public agency must balance certain competing considerations. On one hand, by granting only exclusive rights, the public agency will limit the number of third parties that will have access to the right-of-way at any given time, thereby promoting the agency's objectives in maintaining the safety and integrity of the highway. Further, by granting exclusive rights, the public agency may increase the perceived value of the access rights offered to the potential telecommunications partner. Thus both private and public partners to such an agreement benefit from exclusivity.

On the other hand, granting exclusive rights may foster anti-competitive effects. Non-exclusive access may increase the number of service providers in a given area and promote competition among them, thus benefiting the general public through lower prices for services. In fact, even the threat of entry when access is non-exclusive may generate competition-like results. Moreover, the public sector partner (generally the DOT) may benefit from non-exclusivity by receiving compensation from more than one partner, the sum total of in-kind compensation and cash revenue from multiple partners exceeding the amount likely to be forthcoming from a single exclusive partner.

To address anti-competitive concerns, public agencies might consider requiring that the private party obtaining access to the right-of-way not discriminate in licensing its rights to third parties. In the Iowa Accommodation Policy, the DOT reserves the right to require that longitudinal utility facilities be installed in a multiduct system to be shared with others, and the department is authorized to designate the first utility facility owner requesting occupancy as the "lead company," responsible for design, construction, maintenance, and financing of the multiduct system. As new occupants are added, they must pay their proportionate share. Massachusetts has taken a similar approach.

The case studies took several approaches to exclusivity. Although Missouri has historically restricted utility access on the freeways to outer roadways or "limited utility corridors" in which access is open to utilities meeting state permit requirements, the state's agreement with DTI grants an exclusive easement for 40 years within highway airspace outside the standard utility corridor. Section 227.240 of the Missouri Code allows utilities in highway rights-of-way so long as they do not interfere with the roadway. The DTI facility was defined by the state as a "state highway facility" so it is permitted under the contract to be located in places other utilities are not located. The easement is exclusive only as to other fiber-optics cable systems or communications systems.

DTI's exclusive access is considered a procurement contract, awarded to a single contractor in a competitive process, rather than a special privilege, which might be subject to legal challenge. Missouri published an RFP for telecommunications infrastructure procurement that specified requirements for a basic statewide fiber-optics system. The winner of the contract, to be compensated with access to highway right-of-way for its own telecommunications system in the same corridors as the state system, would be that bidder offering the most attractive package for transportation telecommunications infrastructure and service over and above the minimum requirements.

Although DTI can locate within the standard utility corridor, location in that portion of the right-of-way is not exclusive. The exclusivity provision contains an exception that permits other firm's fiber-optics cables to cross DTI's easement at an approximate right angle, but only upon mutual agreement of the Missouri Highway and Transportation Commission (MHTC) and DTI regarding the location. The agreement expressly states that nothing in the agreement limits MHTC's authority to install its own fiber-optics cable within MHTC air space for highway purposes.

In an interesting approach to exclusivity, the City of Leesburg Telecommunications Service Agreement with ACN requires that if other entities express interest in the City's cables, ACN must coordinate connection and equipment used for those connections. ACN is permitted to bill those other entities for time and materials spent in the evaluation. Further, since the city is sharing revenues from ACN's marketing of the network, it prohibited ACN from competing with the city's cables.

Essentially, there are two levels of private sector exclusivity in Leesburg: (1) the number of private sector partners involved in the shared resource agreement, and (2) the number of telecommunications service providers gaining access to the fiber-optics infrastructure. ACN is granted exclusivity as the marketing partner for city-owned cable built under the ACN-Leesburg contract. Leesburg is free to allow additional vendors to operate within the service area under other agreements with the city, and the "Leesburg Telecommunications Systems Permit Ordinance" appears to contemplate open access to multiple vendors. Exclusive access to the City-owned telecommunications capacity is not granted to telecommunications service providers. The fact that ACN is marketing infrastructure capacity on behalf of the City (rather than supplying telecommunications services itself) means that access is offered to bypass systems and common carriers, which compete with each other and with providers not using the City's infrastructure.

The Leesburg-ACN agreement has a unique reverse-exclusivity provision. Within the service area, ACN may not offer certain services to any person or entity on cables other than the cables provided by the City unless the City gives its prior written permission.

In Maryland, although the rights granted to MCI and TCG are technically non-exclusive, the private partners have "practical exclusivity" because the state does not want to dig into the right-of-way more than once, and therefore will probably allow only one company to put in fiber and oversee maintenance. Additional partners would have been accepted if they had responded to the RFP with an acceptable bid. The window of opportunity was defined by Maryland for both practical and safety reasons. The state does not want to create problems with traffic congestion and accidents from additional construction. In the Baltimore-Washington Corridor, MCI has installed two conduits, one for itself and one for Maryland, with no excess capacity. The state's preferred situation would be for a "bank of conduits" to be laid by MCI as the initial vendor, with excess capacity that the vendor can then sell or lease to future interested vendors at a mutually agreed-upon price. The licensing agreements for the Ohio Turnpike Authority's right-of-way are expressly non-exclusive.

Finally, Caltrans' lease of air space to BART appears to be exclusive for the conduit system. In turn, BART's license to MFS is expressly made non-exclusive; however, as long as the conduit system between two adjacent BART stations has unoccupied capacity and MFS is not in default under the agreement, BART has agreed that it will not grant a license for purposes of installing a communications system between such points. After the system is fully occupied this exception ceases, even if space later becomes vacant; however, BART must thereafter provide a right of first refusal to MFS if BART wants to add conduit capacity.

Summary Table of Exclusivity	
CASE STUDY	APPROACH TO EXCLUSIVITY
Missouri	Exclusive easement outside standard utility corridor
City of Leesburg	No exclusivity for private party; city has exclusive right to ACN's services on cables provided by city
Maryland	Technically no exclusivity; practical exclusivity due to closed window of opportunity
Ohio Turnpike	No exclusivity
BART Caltrans MFS	Exclusive lease Non-exclusive license

5.2 OTHER PROJECT STRUCTURE ISSUES

Other issues in structuring shared resource projects relate to the form of the property right to be granted, type of compensation paid to the right-of-way owner, and geographic scope of the project.

5.2.1 Form of Real Property Right

The form of the right to install and operate telecommunications facilities longitudinally in the public right-of-way involves two core issues: (1) what public resource is being shared and (2) how the right of sharing should be offered to the private sector.

The type of public resource to be shared with the private sector is directly affected by the constraints on public sector authority to use right-of-way for telecommunications facilities. Can the public sector sell a property right which gives access to the right-of-way (i.e., convey a permanent easement), or must it provide access on a lease or license basis for privately owned conduit or cellular towers? Or is it precluded from both, but permitted instead to grant private sector access on a lease or license basis to a publicly owned conduit or tower?

Additional factors may influence the type of public resource, even where the public agency has expansive authority. For example, an agency may prefer to own the conduit, rather than granting an easement in the right-of-way, in order to maintain complete control of maintenance. For several reasons, however, public agencies may prefer to grant a more extensive interest in the right-of-way if allowed by state law. In most shared resource projects, the public agency will prefer to have maintenance of the fiber system remain the responsibility of the private party. The public agency will probably have to bear some of the cost of constructing the conduit if it is to retain ownership. Moreover, leasing conduit space may be construed as a type of ongoing business enterprise which puts the public agency in the position of a regulated public utility—a position most transportation agencies will prefer to avoid.

The related issue of how the right of access should be offered to the private sector is also governed in the first instance by any constraints on the authority of the public agency to use right-of-way for telecommunications. Access to the right-of-way can be granted under a variety of legal forms which vary in permanence and the extent of rights granted to the private party:

- *Easement*: a property interest in land owned by another. The types of uses allowed vary by state but, traditionally, easements are limited to certain uses including rights-of-way.
- *Lease*: an agreement that gives rise to the lessor/lessee relationship by granting rights to use property for a specific time period. There are many different forms of lease payment, including fixed-price, percentage, and graduated based on an independent index.
- *Franchise*: generally, a privilege granted to engage in defined business practices. Typically, a franchise is a business privilege and is not viewed as a real property right although, where land is involved, some states classify franchise as a form of real estate.
- *License*: the permission to perform an act which, without such permission, would be a trespass or otherwise illegal. This is a type of permit that is granted, for some consideration, to a private party to allow the practice of some business subject to police power regulation.

Generally, an easement gives the private party the most control, while franchises, leases, and licenses grant decreasing levels of private control, although the rights granted can vary significantly depending on the provisions of a particular agreement. The most basic distinction among the four forms is that easement and lease agreements give rights to the land, while franchise and license arrangements may not.

In general, the four forms have differing implications for business, including some tax consequences. Property rules differ among states, however, and the nature of the property right granted under each form depends greatly on the terms of the grant. In fact, the different ways in which a private party can be granted access to the right-of-way may be less important than the specific terms of the grant—a more favorable lease may be more desirable to a private party than a restricted easement.

Colorado's Concorde procurement (for placement of coin and coinless landline and cellular pay phones) explicitly conveys only a license, which is a "personal property right to [the] vendor and rests no property interest in the state right-of-way to the vendor." Similarly, Palo Alto's agreement explicitly states that it provides a license, not a franchise; private sector telecommunications providers access a publicly owned conduit managed by MFS but do not control the conduits themselves. Massachusetts' policy provides for granting a revocable license; the state owns real property improvements and the licensee owns all telecommunications equipment; however, the Missouri agreement grants an easement in the right-of-way to the private partner.

A concomitant issue is that of responsibility for maintenance of the communications infrastructure. A publicly owned system that leases capacity to private sector users will be maintained by the public sector; a privately owned system that leases capacity (but does not relinquish operating control) to the public sector will be maintained by the private owner. A mixed system raises some issues. A private party providing the network segment will probably want to control maintenance of the entire segment, including both its portion of the facility and any facility provided for public agency use, particularly if the two components are not physically distinct. This arrangement could complicate management of the network and isolation of network problems. Although installing the public and private facilities in separately maintainable conduits may reduce this problem, it would cost more.

5.2.2 Type of Consideration

Structuring a shared resource project involves determining the type of consideration that the public sector will receive from its private partner in return for the right to install and operate telecommunication facilities in the public right-of-way. Statutory or regulatory constraints on the public agency's ability to receive cash compensation for access may play a significant role in delineating the form of consideration. The type of arrangement most appropriate or desirable to the telecommunications industry should also be considered.

Shared resource projects to date have focused primarily on bartering right-of-way access for dedicated capacity. For example, Missouri's agreement with DTI gives the state a dedicated fiber bundle, telecommunications equipment, and services, but no financial interest. Maryland negotiated similar in-kind arrangements for its shared resource project (with two partners) on I-95. Massachusetts has asked private industry partners to provide the state with a one-time benefit in the form of dark fiber to enhance the commonwealth's private communications network and IVHS communications backbone.

The advantage of cash compensation is flexibility: It can be applied toward any transportation or public sector need, subject to statutory limitations on earmarking. An important advantage of barter arrangements is the wide spread between cost to lessee and value to lessor of in-kind compensation. That is, the right-of-way owner receives more in value than the lessee pays for the incremental infrastructure, which is not true for cash arrangements, where a dollar is worth a dollar to both parties. In other words, the avoided cost of telecommunications infrastructure desired by the lessor is significantly greater than the actual cost to the lessee of adding fiber-optics capacity in a conduit that the lessee is already installing for its own use, due to economies of scale in construction. In fact, needs-based compensation is often supported with estimates of costs avoided when physical infrastructure is supplied in exchange for right-of-way access; this helps right-of-way lessors affirm that they did indeed receive significant compensation for granting access.

In requesting in-kind services a public agency might find that, unless its documents are drafted broadly, it unnecessarily limits the value that it will receive for its right-of-way to a specific need to be addressed today, instead of harnessing that value to serve future needs. Moreover, the type of consideration required may effectively limit the universe of private entities able to take advantage of public right-of-way. For example, if the public agency specifically requires in-kind ITS services in return for access to the right-of-way, it may effectively weed out telecommunications firms that are not involved in ITS and thereby give firms with both telecommunications and ITS capabilities a perceived or real competitive advantage in the industry.

A more general disadvantage of strict needs-based compensation is the chance of settling for less than the lessee would be willing to pay. Some public agencies have combined cash compensation with needs-based compensation, thus garnering more than they would if they had settled for needs-based compensation alone. When cash compensation is based on a proportion of revenue received by the private partner, the agreement assures the public partner of compensation above in-kind needs yet accommodates any private partner with an aversion to fixed cash commitments unrelated to the venture's success. For example, Caltrans is compensated with a portion of the cash revenues generated by MFS/BART leases as well as with fiber-optics capacity for its own use. On the other hand, several potential private partners, who participated in a workshop on shared resource projects, indicated that they were averse to revenue sharing with the public sector right-of-way owner unless that agency had shouldered some of the financial risk of the venture (which BART and Leesburg both did).

Another way to extend public sector benefits beyond needs-based compensation is through construction of excess public sector capacity, which the agency can then lease or use for other public agencies or even lease for a fee to private sector users. This option, however, may be precluded by statutory constraints (e.g., constraints on unregulated public utilities) or even by public opinion (mobilized against public sector competition with private telecommunications providers).

Aside from statutory limitations on cash arrangements, one of the strongest arguments in favor of in-kind compensation is timing. Barter arrangements may be more easily effected in a short time and, when the window of opportunity is limited, speed can make the difference between a deal and no deal.

5.4.3 Geographic Scope

Shared resource projects can be state-wide in geographic scope or limited to a single highway segment or municipality. Choice of project scope is a function of public sector needs, administrative preferences, and private partner focus. In turn, geographic definition can affect private partner response and, as well, the kind and magnitude of compensation received by the public sector. The impact of geographic scope on bidder response can be conditioned by the public sector's decisions on exclusivity.

In essence, there are three basic geographic formats plus a hybrid (fourth) format:

- *Extensive single project*-all (or most) segments and corridors in the public sector telecommunications plan are included in a single project;
- *Several smaller projects*, addressed independently-the state-wide plan is disaggregated into a series of regional projects, negotiated separately;
- *Bidder-defined projects*-the public sector invites bidders to define project scope in terms of rights-of-way segments that interest them; and
- *Bidder-constructed packages* aggregated from individual public sector-defined projects-a hybrid of the second and third approaches allowing bidders some flexibility in selecting geographic regions but precluding any "cherry picking" of specific road segments within each project area.

The disadvantage of projects that are extensive in scope is that they may discourage small bidders and firms interested only in limited areas. If private partners are willing to undertake such projects, however, the public sector is assured of sufficient geographic coverage (though breadth may be at the expense of depth in equipment support).

On the other hand, a series of smaller projects or bidder-defined projects encourages different (and maybe more) bidders. But, if potential private sector partners are interested in only some of the projects or right-of-way segments, the public sector may have gaps in its telecommunications backbone that will have to be filled in at public expense. Moreover, long distance telecommunications providers may be discouraged from bidding on any projects unless they can be assured of access within a reasonable time period to contiguous right-of-way segments, which are distributed among different projects. If individual projects are awarded on an exclusive basis, one project at a time, long distance carriers run an even greater risk of ending up with gaps in the system they want unless they are prepared to outbid all competition for critical right-of-way links.

The hybrid format, which imposes some constraints on "cherry picking," could impose an excessive planning and institutional burden on the public sector because all projects would have to be ready to go to bid at the same time.

At base, decisions on project scope are conditioned by administrative considerations and the type and strength of market demand for highway rights-of-way-that is, private sector willingness to undertake extra financial or barter obligations in order to gain access to rights-of-way that are integral to their business development.

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U.S. Department of Transportation

6.0 CONTRACT ISSUES

Contract issues address the details of each partnering arrangement, particularly the allocation of responsibilities between public and private partners and operational conditions specified by either party. As they focus on fine-tuning the partnership arrangement, contract issues are the last in the logical development of a shared resource project. Focus group participants were particularly interested in research on two issues: responsibility for *relocation* of telecommunications infrastructure when highway improvements require it; and allocation of *liability* between public and private partners in case of damage or accidents.

6.1 RELOCATION

Typically, when a utility is granted a franchise in the public right-of-way, the franchise law provides that the utility must relocate at its own cost in the event that the public agency with jurisdiction over the right-of-way wants to improve it. In the case of shared resource projects, two factors that have supported this policy in the past may be subject to challenge: (1) the belief that private companies gaining access to public property (right-of-way) do not compensate the public sector for the full value of the benefit they receive, and (2) an accepted definition of "improvements."

First, as noted earlier, utilities gaining longitudinal access to public sector rights-of-way in the past often paid no fees for such access or paid significantly less than the full market value of the rights granted. This "windfall" might have justified requiring the utility to relocate at its own cost. In a shared resource project, however, this traditional rationale may no longer fit if the party granted access to the public right-of-way has paid fair market value for such access. The variety of relocation arrangements negotiated in the case studies indicate a shift away from the traditional pattern (of utility responsibility for relocation) that may be due to loss of the windfall benefit that justified it.

Second, despite laws that require relocation at the utility's expense to accommodate "improvements" to the public right-of-way, utility responsibility for relocation could be challenged if the partners do not agree on what constitutes a legitimate right-of-way or roadway improvement. Two kinds of roadway alterations can trigger relocation: (1) road widening and other highway road surface or right-of-way construction, and (2) installation within the right-of-way of transportation-management facilities. It is the latter activity that may invite questions of interpretation if terms are not clearly defined in advance.

Consider a situation in which a telecommunications company is granted a right to install conduit in the public right-of-way provided that it also installs conduit for non-transportation-related government services. Then, after entering into that arrangement, the public agency decides to install automatic vehicle identification or ITS applications in the public right-of-way, and the most efficient design of such system would require relocation of the previously installed telecommunications lines.

While such activity should be considered an "improvement" to the roadway within the police power of the public agency and therefore trigger the telecommunications firm's obligation to relocate at its own cost, traditionally "improvements" have been conceptualized as physical improvements to the roadway. A court might not construe the term "improvement" broadly enough to include changes that modify driver behavior rather than the physical road. Further, if the public agency has entered into a public-private partnership to accomplish its goals, under the existing law a court may conclude that because of the "privatized" aspect of the relationship, the private entity whose facilities were placed in the road at the earlier point in time cannot be dislocated by another "private" entity.

Thus in shared resource arrangements, where it is considered appropriate to require the private entity to assume all or a significant portion of relocation costs to accommodate public sector-initiated improvements, the public agency should not rely upon existing laws to accomplish the desired result. It appears that most parties involved in the case studies anticipated this issue and thus incorporated fairly specific relocation provisions into their contracts; however, there is no consensus among the case studies on the allocation of responsibility among the concerned parties.

For example, the Ohio Turnpike agreement requires relocation, alteration, or protection of the telecommunications facility, at the licensees' sole expense, in order to avoid interference with the *operation*, reconstruction, improvement, or widening of the Turnpike. The term "operation" should be construed broadly enough to include ITS applications; however, an agency

modeling its agreement after Ohio's might consider expanding the definition of the scope of "operation" even more. The Iowa Accommodation Policy requires the utility facility owner to relocate at its own costs and it does not guarantee that if relocation is required, an alternative permit to occupy the right-of-way will be provided.

In contrast, the other case studies demonstrated that the "partnership" nature of shared resource projects suggests a departure from the traditional policy of imposing all relocation costs on the private party.

The Baltimore-Washington Corridor RFP for Maryland provides for cost sharing; that is, the state will pay for the necessary duct for the fiber-optics cables when relocation of the duct is required by construction or reconstruction of the roadway, and the contractor will relocate and provide ancillary equipment to reestablish the network connectivity to operate at "pre-move" performance levels. Potential contractors requested that the state commit not to require relocation for at least five years from the contract date. The state represented that it did not expect to move facilities within that five-year term, but it would not commit contractually to refrain from doing so. It is unclear whether relocation responsibility in the event of "modification" of the highway would include responsibility in the event that the state installs an ITS application.

In the BART-MFS License Agreement, BART is obligated to designate a new route for the conduit if it must be relocated, and all costs not paid for by a third party are to be paid by BART. One of the parties explained in an interview that this provision reflects the partnership nature of the arrangement. MFS stressed that, to attract private sector vendors as partners, the state needs to be willing to assume some of the risk associated with future state actions.

Like the BART agreement, Missouri's agreement provides that the state will bear the cost of relocating. Again, this probably reflects the fact that in the Missouri RFP, contractors were requested to make a significant investment in the provision of in-kind services to the state with no cash compensation. MHTC has the option either to acquire additional right-of-way in which to place the fiber-optics cable corridor in a manner acceptable to the fiber-optics contractor or to remove and relocate other utilities at its own expense, so that the fiber-optics contractor may place its fiber-optics cable system in the utility corridor if necessary.

Summary Table of Relocation Responsibility	
CASE STUDY	ALLOCATION OF RESPONSIBILITY
Missouri	State is responsible
City of Leesburg	Not explicitly addressed; responsibility appears to be city's
Maryland	Cost sharing: state provides duct; private partner relocates and reestablishes connectivity
Ohio Turnpike	Responsibility of private party
BART	All costs not paid by third party are paid by BART

The City of Leesburg document does not explicitly address relocation. It should be noted, however, that the agreement has only a five-year term. Therefore, it is likely that relocation was not viewed as a significant issue. In any case, the City owns the fiber-optics cable system and ACN acts as a broker without ownership. Therefore, it would be logical for the City to assume (financial) responsibility for relocation.

6.2 LIABILITY

Liability issues can develop as a result of

- System failure, which could be due to physical damage in the roadway or internal malfunctioning,
- Vehicular accidents resulting from interference in the roadway, and
- Breach of warranty.

Questions of liability for system malfunctions are especially important in shared resource projects where both public and private parties actively work in the right-of-way, with an attendant risk of damage, and both depend on the telecommunications infrastructure. Two types of roadway work occur in the rights of way: (1) installation and maintenance of the telecommunications infrastructure generally, but not always, undertaken by the private sector partner(s), and (2) construction, renovation, and maintenance of the roadway and right-of-way undertaken by the public authority. Both can trigger system failure (as can other factors) and vehicular accidents. Moreover, both can involve costs of physical "repair" and consequential damages.

Shared resource projects can involve a number of different types of liability: system repair, consequential damages and tort liability, among others. Other issues related to allocation of liability may also be raised: public agency immunity from liability may be compromised by participation in a public-private venture, and participants may experience difficulty in finding insurance to cover all identified risks. The documentation for each of the case studies addresses these issues similarly; however, careful reading of the contract provisions shows that seemingly minor differences in choice of language

can result in significantly different allocations of liability between the parties.

6.2.1 System Repair

System damage may be caused by any party working in the roadway either on the telecommunications system itself or on transportation-related activities such as posting new signs. In the case studies reviewed, responsibility for physical repair of damaged infrastructure generally rests with the party that causes damage. In the Missouri documents, MHTC is not responsible for any liability incurred by the fiber-optics contractor. The contractor then assumes responsibility for all injury or damage for any *negligent* acts or omissions by it in services rendered under the agreement and agrees to "save harmless" MHTC for any expense or liability arising out of such negligent acts or omissions of the fiber-optics contractor, its contractors, subcontractors, agents, etc. The MHTC *has* assumed liability for actual repair costs if MHTC's personnel, contractors, or subcontractors damage or destroy any part of the fiber system or equipment installed by the fiber-optics contractor.

In the Maryland documents, the state's liability is limited to repair of any facilities that it damages. From a strictly legal drafting perspective, the Ohio Turnpike Agreement contains excellent broadly drafted indemnities. The Commission is only liable to the licensee to the extent that damage to its system is caused by the Commission's "gross" negligence.

6.2.2 Consequential Damages

Consequential damages (i.e., damages resulting from service interruption or breach of warranty) are potentially a significantly greater liability concern than system repair.

The public agency will want to limit its liability for damages to the network occasioned by routine road work. For example, in the City of Leesburg project, all liability for service interruptions is allocated to the private party. The Iowa Accommodation Policy relieves the state from any liability for lost profits or business, indirect, special, consequential, or incidental damages in the case of its negligence.

A liability concern peculiar to shared resource projects is raised when separate cable or conduit is installed for the public and private parties, as in Palo Alto. In these circumstances, each party's maintenance activities on its own cable or conduit present a risk of damage to the other party's facility (assuming that maintenance for both facilities has not been delegated to a single party). Palo Alto's agreement with Digital Equipment Corporation provides that in the event damage is caused to a party's cable or conduit by the other party there is no liability for indirect, special, or consequential damages.

Liability issues are particularly complicated when multiple private vendors are permitted access to the public right-of-way. If there is a system failure, unless an adequate dispute review mechanism is set up so the public agency can require all potential parties to join their claims in one action, the public agency is exposed to the possibility of inconsistent results. None of the case studies addressed this issue directly; however, Massachusetts requires that the lead company and all participant companies agree to unified arbitration of disputes by the American Arbitration Association.

In the Missouri documents, the fiber-optics contractor assumes responsibility for all warranties and liabilities for service and performance to ensure satisfactory network performance. The documentation further provides that MHTC is not responsible for any liability incurred by the fiber-optics contractor. The contractor then assumes responsibility for all injury or damage for any *negligent* acts or omissions by it in services rendered under the agreement and agrees to "save harmless" MHTC for any expense or liability arising out of such negligent acts or omissions of the fiber-optics contractor, its contractors, subcontractors, agents, etc. MHTC has not assumed any liability for lost revenues or other incidental or consequential damages sustained by the fiber-optics contractor.

In the Maryland documents, the state's liability is limited and under no circumstances is it liable for consequential damages for a break in the line. The contractor is strictly liable to indemnify the state for any dissemination of information pertaining to the contract and for its negligent performance of services under the contract. According to the interviewees, this was a significant issue in the negotiation of the contract. Because of MCI's status as a major long-distance contractor, potential liability costs for "consequential" damages could run into millions of dollars.

In the Ohio Turnpike Agreement the licensee is required to hold the Turnpike Commission harmless from losses, costs, claims, damages, and expenses arising out of or related to any claims as a result of the Agreement. The Commission is specifically granted the right to its defense by its own counsel and to maintain control over any claims made against it.

An important point is that the licensee is required to provide in the contracts with its customers that the customer protects the licensee and the Commission from liability for consequential damages due to service interruptions. This provision contrasts with that of the BART-MFS Agreement, in which the licensee's customers are required to indemnify MFS, but not BART. MFS indemnifies BART for everything resulting from MFS's performance under the Agreement, regardless of the negligence